

**CLAIMS**

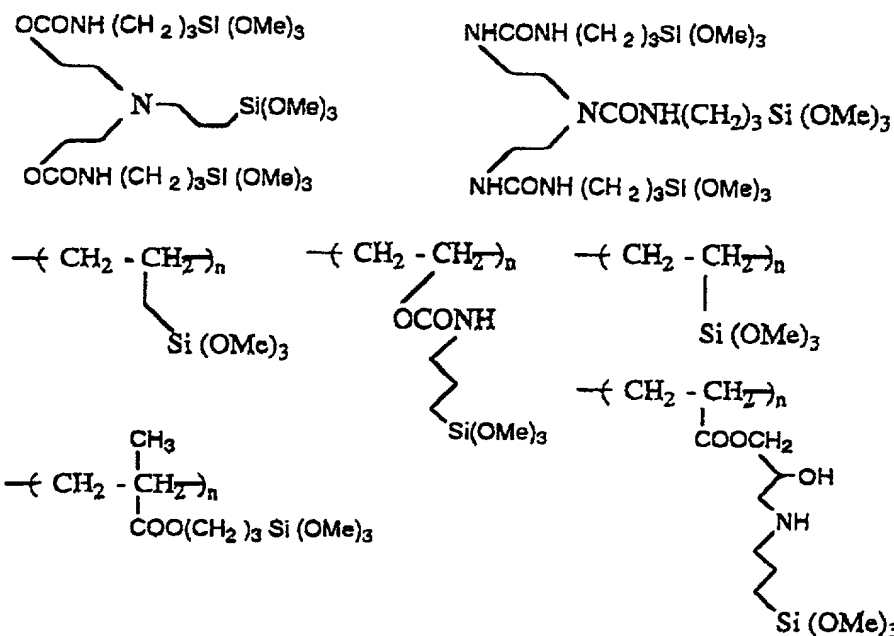
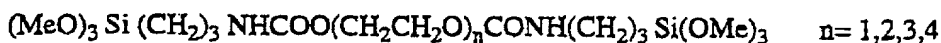
1. A method of preparing sol-gel encapsulated phospholipid vesicles comprising:

- 5 (a) sonicating an aqueous solution of a phospholipid to form a solution of multilamellar vesicles;
- (b) freezing and thawing said solution of step (a) at least five times;
- 10 (c) filtering said solution of step (b) to form a solution of small unilamellar vesicles; and
- (d) curing said solution of step (c) for at least one day.

2. A method of preparing sol-gel encapsulated vesicles comprising:

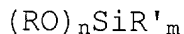
- 15 (a) sonicating an aqueous acidic solution of a silyl lipid, or a mixture of a silyl lipid and a phospholipid, to form a solution of multilamellar vesicles;
- (b) filtering said solution of multilamellar vesicles of step (a) to form a solution of small unilamellar vesicles;
- 20 (c) mixing said small unilamellar vesicles of step (b) with a solution of inorganic-organic hybrid mixture sol; and
- 25 (d) curing the solution of step (d) for at least one day;
- said vesicles comprising silyl lipid or a mixture of silyl lipid and phospholipid.

3. The method of claim 2 wherein said hybrid mixture sol is prepared from precursor molecules of the following formula:



4. A method of performing renal dialysis by using sol-gel encapsulated lipid vesicles; said lipid vesicles comprised of phospholipid, silyl lipid or a mixture of phospholipid and silyl lipid, said lipid vesicles being positioned in the sol-gel encapsulation material.

5. The method of claim 4 wherein said silyl lipid is of the formula:



wherein:

R is selected from a group consisting of C<sub>1</sub>-C<sub>50</sub> alkyl;

R' is selected from a group consisting of (CH<sub>2</sub>)<sub>q</sub>A and OSiR<sub>3</sub>;

A is selected from a group consisting of hydrogen, COO<sup>-</sup>, OH, COOH, N<sup>+</sup>R<sub>1</sub>R<sub>2</sub>R<sub>3</sub>, NHR'', SH, SR'' and C<sub>1</sub>-C<sub>50</sub> alkyl;

R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R'' are selected from a group consisting of (CH<sub>2</sub>)<sub>q</sub>CH<sub>3</sub> and (CH<sub>2</sub>)<sub>q</sub>Si(OR)<sub>3</sub>;

q is a number from 1 to 50;

n is a number from 1 to 4; and

m is a number from zero to 3.

6. The method of claim 4 wherein said sol-gel encapsulation material is an inorganic-organic hybrid mixture sol.

7. The method of claim 6 wherein said inorganic-organic hybrid mixture sol-gel is a gel formed from an inorganic-organic hybrid mixture sol solution.

8. The method of claim 4 wherein said hybrid mixture sol-gel is prepared from precursor molecules of the following formula:

